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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicants : Wen-Chen Su et al.

Appl. No. : 09/918,652

Filed : March 22, 2000

For : METHOD FOR FORMING MULTILAYER RELEASE LINERS AND LINERS FORMED THEREBY

Commissioner for Patents
P.O. Box 1450
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DECLARATION UNDER 37 CFR § 1.132

I, Adrian Hulme, am a citizen of the United Kingdom of Great Britain and Northern Ireland and reside at 6029 White Oak Drive, Mentor, Ohio 44060. I received a Bachelor of Science (honors) in Chemistry from the University of Lancaster, and I have worked in plastics industries for twenty-six years. I currently am employed as Component Program Manger of Fasson Roll North America.

I am an inventor in the above-captioned application (Su et al.), and I am familiar with the Su et al. application. I also studied U.S. Patent No. 5,229,212 (the Reed patent) which has been cited during the prosecution of the above-identified application.

I have conducted tests to compare sample liners prepared in accordance with the specification of the Reed patent with sample liners prepared in accordance with the specification and claims of the above-captioned application (Su et al.). The Reed patent discloses a silicone-containing coating applied to an uncoated paper or to a pre-coated paper (col. 7, line 50). On July 21, 2004 I executed a Declaration describing an

analysis in which I compared sample liners prepared in accordance with the specification and claims of the above-captioned Su et al. application with sample liners prepared with the Reed silicone-containing coating applied to previously uncoated papers. I believed that was the most relevant analysis because the specification and claims of the above-captioned application employ a previously uncoated substrate. However, I now understand that a more pertinent analysis would compare the sample liner prepared in accordance with the specification and claims of the above-captioned Su et al. application to the sample liners prepared by applying Reed's silicone-containing coating to a pre-coated paper.

My July 21, 2004 Declaration stated that samples produced pursuant to Su et al. used a dual slot die so that the silicone and the support were deposited substantially simultaneously. I have reviewed that data and confirm that the support expressed from one slot of the dual slot data die was Gencryl 9705 from Omnova Solutions. This is an emulsion based on styrene-butadiene-acrylontrile chemistry and is commonly used in the paper coating industry.

I conducted tests to compare the anchorage of the Reed silicone-containing release layer to the pre-coated paper with sample liners prepared according to the specification and claims of the above-captioned Su et al. application. The following paragraphs describe the sample preparation and tests performed on the samples.

Reed Patent

Samples prepared pursuant to the Reed patent employed a clay coated paper from UPM-Kymmene that was identified as UPM CCK Office 55. This clay-coated paper was passed through a bath of Wacker Dehesive 450, which is an emulsion containing vinyl terminated polydimethyl siloxane. The cross-linker used was Vernetzer

V72, which is an emulsion based silicone hydride. One set of samples used a bath contained approximately 2% of the PEO thickener described by Reed. A second set of samples used a bath without the PEO thickener described by Reed. I decided to prepare this second set of samples because a PEO thickener is not disclosed in the above-captioned Su et al. specification. I thought a sample of the Reed release liner minus the PEO thickener could be instructive when compared to the Su et al. samples described below. An adhesive was applied to one sample of the Reed release liner made with the PEO thickener and to one sample of the Reed release liner made without the PEO thickener. The adhesive used was a tackified emulsion acrylate commonly used in the pressure sensitive adhesive industry and was supplied by Avery Dennison Performance Polymers. Reed release liners with and without the PEO thickener were retained without adhesive.

U.S. Patent Appl. No. 09/918,652 (Su et al.)

These samples employed an uncoated paper face stock known as Data 68. A support layer and a release layer then were applied substantially simultaneously with a dual slot die as disclosed in Appl. No. 09/918,652. The support layer applied by the dual slot die was a Gencryl 9705 from Omnova Solutions. This is an emulsion based on styrene-butadiene-acrylontrile chemistry and is commonly used in the paper coating industry. The release layer was a Wacker Dehesive 461 emulsion containing vinyl terminated polydimethyl siloxane. Wacker Dehesive 461 and Wacker Dehesive 450 are chemically virtually the same, but have different rheologies. The Wacker Dehesive 461 has flow characteristics appropriate for a dual slot die but less suitable for other coating. The Wacker Dehesive 450 is not expressed properly from a dual slot die. The cross-linker for the release coating was Vernetzer V72, which is an emulsion based silicone hydride.

One sample produced in accordance with Appl. No. 09/918,652 was coated with an adhesive, while the other was left uncoated. The adhesive used was a tackified emulsion acrylate commonly used in the pressure sensitive adhesive industry and was supplied by Avery Dennison Performance Polymers.

Anchorage

The anchorage of the release coatings was measured by the Durlac method. This method uses a piece of velvet that is rubbed over the surface of the liner. The release coating coatweight is measured before and after the rubbing. The difference in this coatweight before and after rubbing is expressed as a percentage of the release coating remaining and indicates how well the release coating is anchored.

Half of the test samples were analyzed under ambient laboratory conditions. However, half of the samples were put into an accelerated aging chamber with high temperature and humidity (65°C and 80% RH) to simulate natural aging of approximately one year. The results of the tests are shown in the following table.

Table 1

Sample	Liner	Adhesive Coated	% Anchorage Natural Aged	% Anchorage Accelerated Aging
1. Reed+PEO	CCK	no	83.4%	89.2%
2. Reed+PEO	CCK	yes	83.8%	84.3%
3. Reed (no PEO)	CCK	no	82.5%	84.5%
4. Reed (no PEO)	CCK	yes	78.4%	81.9%
5. Su et al.	Data 68	no	100.7%	98.8%
6. Su et al.	Data 68	yes	99.9%	99.5%

Table 1 shows that PEO and aging both improve the anchorage of Reed's release coating on a pre-coated paper. However, Table 1 shows significantly enhanced anchorage for the sample produced in accordance with the specification and claims of U.S. Patent Appl. No. 0/918,652 as compared to Reed. The value of greater than 100% in sample 5 merely reflects a normal range of measurement errors, and suggest virtually no release coating removal. The anchorage demonstrated by the Reed samples in Table 1 is about what I would have expected. However, the nearly perfect anchorage demonstrated by the Su et al. samples in Table 1 is unexpectedly better than I would have predicted. This excellent anchorage for the Su et al. samples is particularly significant in view of the good release characteristics demonstrated in my July 21, 2004 Declaration and in view of the cost advantages associated with the use of an uncoated paper as opposed to a pre-coated paper.

I declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements will jeopardize the validity of the application and any patent issued thereon.

Date: 3/28/05

Adrian Hulme